THE RUBBER AGE AND TIRE NEWS

AUGUST 10, 1920 VOL. VII. NO. 9

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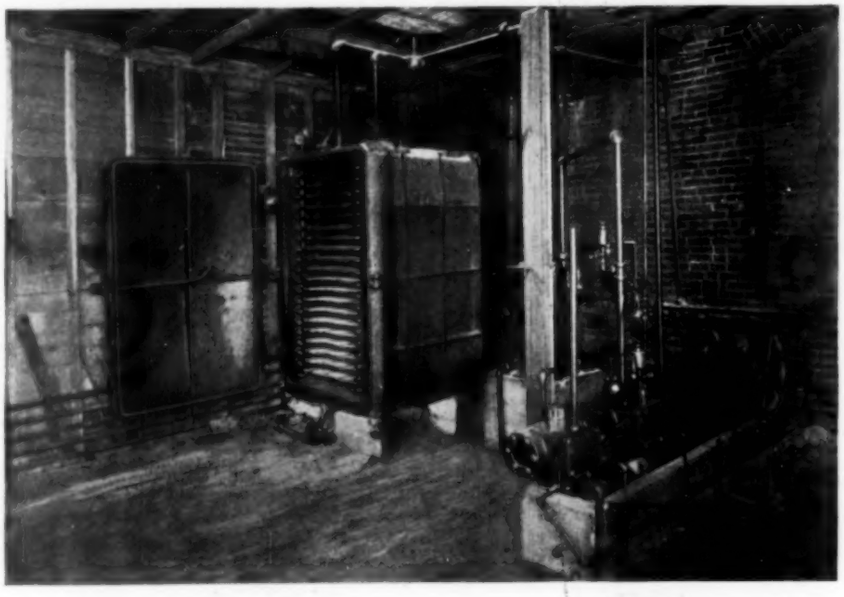

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THE RUBBER AGE AND TIRE NEWS

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Vol. VII AUGUST 10, 1920 No. 9

How Can We Increase Production?

By Sidney J. Williams

Secretary and Chief Engineer, National Safety Council

Production depends primarily on two factors—machines and men. Production also requires materials but these in turn are produced by other machines and men—using "machines" broadly to include all equipment. Production also requires capital to provide the machines and the men, and management to direct them. But machines and men are the immediate producers. They and they only can increase or decrease production. The things that cause them to do the one or the other are the things that we must study.

The basis of modern production, with respect to both machines and men, is regularity—standardization. The Swiss watchmaker a hundred years ago built his watch from the ground up, fitting each part to the parts already completed, as a carpenter builds a house. He never made two watches exactly alike. I believe the Swiss watchmaker still follows somewhat the same method. But we in America make our dollar watches (which now sell for two dollars) and our two dollar alarm clocks (which now sell for four) with dies and jigs and fixtures; we stamp out the parts on power presses or machine them in automatic screw machines, so that part number 106 always fits part number 105 exactly, although the men who make the two parts may never have seen each other and may not speak the same language. Whether in the eyes of an artist all the alarm clocks in America are worth a single beautiful Swiss watch, is a question that I will leave to philosophers. We as a nation are committed to the principle of mass production; and while we may deplore the vanishing of the old craftsman, few will seriously suggest a return to the former order.

Operations of Men Standardized

But we do not stop with standardizing machine operations. We standardize also the operations of men. The motion study expert tells us that practically every man wastes a large percentage of his time and effort in even the simplest operation—that a dozen skilled mechanics will do the same thing in a dozen different ways, all of them wrong. So the motion study expert determines the one best way to do a job, and in one case after another we find that by following his method we not only increase production but we decrease fatigue. While so called "efficiency engineering", like other pioneer movements, has suffered from the pretensions of quacks, there can be no serious question that modern industry demands the elimination of lost motion and the standardization, so far as is practicable, of every job in the plant.

If this is true, as it is true, I do not believe that any one will question the next proposition that I want to make—that anything which interferes with the absolute regularity of operation is inefficient and uneconomical, and that it is one of the chief functions of the engineer and the executive to hunt out these disturbing influences and eliminate them.

The things which thus interfere with regular production are many and varied. Some of them are external to the plant itself—such as a war, or a nation-wide strike, or a railroad tieup. The prevention of these is largely a function of government, and the American people will not long tolerate conditions that permit such national inefficiencies.

Then there are catastrophes within the plant; a strike; a disabling fire; a break-down in the power plant. Every one knows that it is the function of management to prevent such occurrences and that a management which does not in general prevent them cannot be permanently successful.

Then there is a third group of apparently minor disturbances. A laborer pushing a truck strikes an uneven place in the floor and a casting falls off the top of the load. The casting is heavy and he goes for help to put it on again. Meanwhile the lathe operator is waiting for the casting. The blockade of the passageway stops another truck coming up with material for another operator, who must also wait. The total loss of time may not be more than four minutes for each of five men—twenty minutes in all or, say, twenty-five cents worth of time.

Minor Disturbances Decrease Production

What does the foreman do when he finds that the lathe operator is waiting for material? If he is a foreman of the old school, he goes back and bawls out the "blankety blank wop" for running his truck into a hole in the floor. The man thus admonished, is henceforth more careful—that is, he is slower in his movements. He takes pains to avoid the holes in the floor, the post in dark passageway, the other various sundry obstructions which sprinkle his pathway. A little later the foreman is surprised and grieved to find that he must put on another man to help the truckers because they cannot keep up. He discourses feelingly and eloquently with the assistant superintendent on the total depravity of laborers in general and of his laborers in particular. Am I exaggerating? Not very much. How many of *us* carefully walk around a hole in the floor, or a slippery place, ten times a day, because it would take a little mental and physical energy to fix it up?

Of course, the foreman who is really on to his job has the floor fixed at once. If he is unusually intelligent, he also looks around for other things which interfere with efficient trucking. He may find that the lighting in the passageway is poor, and recommend to the superintendent that it be improved. He may find that the truck itself can be slightly changed so as to make it less likely that anything will fall off. The up-to-date foreman realizes that when his laborers each lose twenty-five cents worth of time a day it is up to him, not to bawl them out for it, but to find out what is wrong and correct it. And it is up to the superintendent and higher executive officers to supply what the foreman lacks in this regard. Once labor was the cheapest part of the cost—but the dollar-a-day man is gone.

* Address before Engineering Section, National Safety Council, Chicago, June 24, 1920.

I have tried thus far to make the point that modern production is built absolutely on standardized regularity of operation and that anything that interferes with regularity interferes with production. It is putting the same thought into other words to say that it is our constant effort to find the one best way of doing things and then always to do them in that way; and that anything which happens unexpectedly, whether it is a coal strike or a casting falling off the truck, is bound to interefere with our regular program and therefore to cut down our production.

The Definition of an Accident

It is interesting to observe that the Standard Dictionary under the word "accident" gives as its first definition this: "Anything happening unexpectedly." In a second definition the dictionary recognizes, of course, the common usage of the word "accident" as meaning an occurence in which some one is hurt. But in the broader meaning it is plain that, from the standpoint of industry, a coal strike is unexpected and is therefore an accident; a breakdown of the power plant is unexpected and is therefore an accident; the sticking of material in a punch press is unexpected—not contemplated or desired by the designer of the machine—and is therefore an accident, whether any one happens to be injured or not. In short, "accident" in the broad meaning given by the dictionary is exactly synonomous with all the disturbing things which interfere with production—it is the exact opposite of production efficiency. It stands precisely for all those things which engineers and executives must fight unceasingly.

Now I come at last to the point where safety enters into the proposition. Some of the "accidents" which I have mentioned—some of the things which happen unexpectedly—result in personal injury. From the standpoint of the man interested only in production, the accidents which happen to injure some one are no more and no less important than those which do not. It is true that from other standpoints the accidents causing personal injury are much more important. To the Legal Department, they mean the payment of compensation. To the Employment Department, they mean the necessity of providing another man. To any man with a spark of human feeling in his heart they mean pain and suffering to a fellow human being, perhaps poverty and distress to his dependents. But leaving these considerations out of account, considering ourselves as absolutely non-human engineers or executives, with an abundant supply of skilled labor and no compensation laws to worry about, even then we must recognize that at the very least the accident which injures some one is no less important than the accident which does not injure any one, and all these accidents—all these things happening unexpectedly—interfere with the regularity of our operation, and cut down our production. No engineer or executive living can afford to say "I am not interested in accident prevention" unless he is willing to say "I am not interested in efficiency"—because accidents and efficiency are absolutely incompatible; they cannot exist in the same plant; the plant where things are permitted to happen unexpectedly is an inefficient plant. Every accident is an indication that there is something wrong with men, methods, equipment, or material.

Accidents Serve as Danger Signals

And if the engineer or executive must then be interested in all accidents, whether they cause injury or not, those which do cause injury have for him a peculiar importance, because they stand out conspicuously and serve as danger signals to warn him of the inefficiency that is undermining his output. This is not theory but fact. The improvements in punch press operation, which I have already mentioned, were suggested and carried out—by whom? By the production department or by some imported efficiency engineer? No—by the safety man! He found that men were losing fingers in these punch presses because they had to reach in to the press to place or remove material. He changed the method of operation by introducing automatic or semi-automatic feeds and kick-outs. He did this primarily to prevent the loss of fingers. Having done it, he found that he had increased production from twenty-five to 100 per cent. The foremen were astonished. They need not have been astonished. Reflection would have shown them that the movement of the operator in reaching into the press, while it occasionally caused the loss of a finger, always caused the loss of time, and that an arangement which would save the occasional finger would also save a fraction of a second every time the machine was operated. To quote another instance of a more general nature, the manager of one of the largest paper mills included in the membership of the National Safety Council once said to me "Before we had a safety committee, every little while we would have to shut down our machine because of a belt breaking or something of that sort. Now our safety inspection catches these things before they happen and we have no more shut-downs. Our safety work has more than paid for itself through the increase in production, aside from cutting down our compensation costs."

You may say—"these plants were not run efficiently. If they had been, it wouldn't have taken a safety man to show them how to feed punch presses or keep belts in repair." I freely grant this. Yet the fact remains that the plants which I have mentioned were and are in the very front rank of their industries, they were well managed, they were making money. The management simply, like every other management that I know of, was so busy with development and with the outstanding problems which it had to face that it could not watch every single detail.

An Example of the Value of Safety

In another instance, even more noteworthy than those I have mentioned, the chief engineer of a large company conceived an entirely new method of accomplishing an important process in the industry—a method wholly mechanical, to replace one which required constant attention by skilled men. It happened that these men were exposed to injurious dust. When the new plan was presented, it was opposed by some of the experienced factory executives who declared on general principles their firm conviction that it would not work. The president of the company said "Even if the new method does not increase production as we hope it will, it will at least remove this danger to the health of our men. Therefore we will try it out."

It was tried out. It worked. It cut down the number of attendants required from twenty-three to three and removed all hazards to those that remained. It increased production so tremendously that it will undoubtedly revolutionize the entire industry. This two-fold result was not a coincidence. It was a natural result of the fact that the old process was wasteful in both materials and time. The injurious dust that should have gone through the manufacturing process was blown into the faces of the men. The new method saved both the dust and the men.

The man who did this remarkable piece of work was not a "safety engineer." He was an engineer who believed in safety. As a man, he believed in safety as a human necessity. As an engineer, he believed in safety as a thing inseparable bound up with engineering efficiency.

The Human Value of Safety

On the human value of safety, I leave you to judge for yourselves. I know how I feel and I think I know how you feel. But that is not my topic. But on safety as an engineering job. —I know that the engineer whom I have mentioned, and the safety man in the punch press shop, and the paper mill manager, are right—I know that safety and engineering efficiency are inseparable. You cannot have one without the other. If safety men think they have to put on a guard that intereferes with production, you may be sure that the remedy is only a temporary one and that it must give way eventually to an improved machine or method which will be safe without being inefficient. And the engineer or executive who thinks that accident prevention is not in his department—that he will leave that to the safety man or the insurance company or the state inspector—is missing something—something big. He will find out some day that every accident in his plant or on the machine which he designed is a danger signal for him—a symptom of time and dollars wasted as well as lives and limbs. The rough shod methods of American industry a generation ago, which left a trail of human wreckage, were not only inhuman—they were inefficient. They and the men who stood for them are gone on the scrap heap and will never return.

The Rubber Stress-Strain Curve

By William B. Wiegand

Director of Manufacturing, Ames, Holden, McCready, Ltd., Montreal, Canada.

(Continued from issue of July 25, 1920)

The simple pendulum oscillating about the point *O*, has attached to it a stretched rubber thread *AC*, fastened exactly in its center *B*, to the pendulum arm. The points *A* and *C* are so chosen as to give the rubber sample any pre-determined elongation. When the pendulum is set in motion, one-half of the rubber sample sustains a slight increase in tension and the other half a corresponding diminution in tension, the result being that to the restoring couple due to gravity there is added an additional restoring couple due to rubber, and having a numerical value of $2ed^2\theta$, where e is one form of the elastic

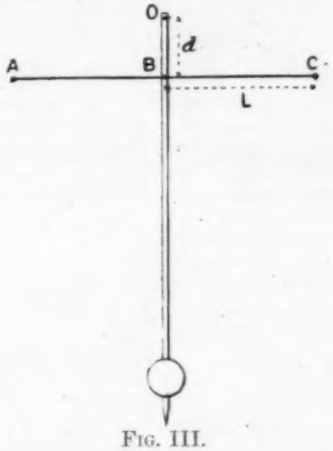

FIG. III.

modulus. The modulus can thus be calculated by a simple measurement of the period of oscillation, first without and then with the sample of rubber attached.

It will be observed that this experiment, as also the two previously described, offers a means of determining what Bouasse calls the dynamic modulus, or a modulus determined at a substantially constant elongation, by repeated slight changes in load. The method of Fig. III. was also used by Mallock in determining the elastic properties of rubber. It has, however, the almost fatal defect that, owing to hysteresis, the energy of the pendulum is so rapidly damped down or degraded as seriously to vitiate the accuracy of measurement of the period of vibration.

In Fig. IV. is shown the specially built pendulum devised by Bouasse for overcoming the errors inherent in the simple pendulum shown in Fig. III. Briefly, O is again the center of oscillation, and *AC* the rubber sample. Concentric with *O* is the arc *RS*, which is alternately attracted by the electro magnets *e* and *f*.

The bar *EF* carries contact points *a*, *b* and *c*, dipping into mercury cups and so completing the electric circuits which energize the solenoid magnets.

Timing Magnetic Impulses

By a special device (not shown) the magnetic impulses are accurately timed so as to occur exactly as the pendulum is passing the neutral position. *In this way there is no disturbing effect on the natural period,* the effect being merely to maintain a constant amplitude.

By the aid of this superbly designed instrument, Bouasse was able to give exact form to many general laws hitherto appreciated vaguely, if at all. Cycles of extension and retraction were traversed and at suitable intervals the elastic modulus determined by measuring the duration of a definite number, say 20, swings of the pendulum. Measurements of the energizing current through the solenoids supplied data as to the energy losses due to hysteresis in the rubber. The following are examples of Bouasse's well-established generalizations. They are valid both for pure gum and for heavily compounded mixings.

1. The elastic modulus decreases with increasing elongation, passes through a minimum and then increases rapidly up to the breaking point.
2. As the cycles are repeated the modulus corresponding to any given elongation decreases: first, very quickly, then slowly, finally reaching a practically constant value. Thus, in arbitrary units, a series of values for the first three cycles (at a given elongation) were 816, 535, and 460.
3. The hysteresis in the moduli is also very great after the first cycle, but is already small in the third cycle, and after five cycles is almost gone.

Perhaps Bouasse's broadest generalization, and one which has profound technical significance, is the following:—

> "Every stretching of vulcanized rubber, every reduction in length, in general every change of form, tends to diminish the value of the modulus corresponding to any given elongation. Also every rest tends to augment it and this augmentation increases in proportion as the position of rest is nearer to zero extension."

Practical illustrations of this will occur to everyone. A stiff rubber band can be "softened" by a few preliminary stretchings. A laboratory test piece which slips out of the jaws of the testing machine before rupture gives, on re-testing, quite abnormal values. In short, the physical properties of vulcanized rubber (as of course those of crude rubber) are a function of its previous life history.

Other ingenious experimental methods were used by the early workers to determine the elastic moduli.

Compression Modulus of Spheres of Rubber

In 1886 Schneebeli determined the compression modulus of spheres of rubber by measuring the diameter of the circles produced by various weights applied to the spheres. The experimental accuracy was good. The variations from the mean were less than 4 per cent.

Impact of Rubber Cylinders

Another suggestive piece of work in this connection was the determination, in 1881 and later, by Boltzman and his

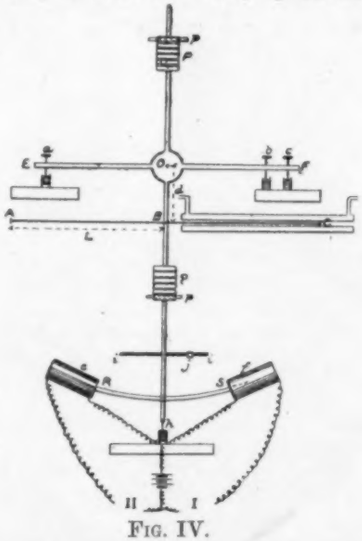

FIG. IV.

pupils of the conditions of impact of two rubber cylinders. The duration of the impact and extent of rebound are a function, among other things, of the rate of propagation

of longitudinal waves through the rubber substance and, therefore, also a function of the elastic modulus.

Hysteresis

Let us now for a moment turn to the question of the retraction curve, which, as everyone knows, differs markedly from the extension curve. The area contained between the two curves is called the Hysteresis Loop. There is no more important quantity in the whole rubber technology than the area of this hysteresis loop. Boileau, in 1856; Villari, in 1869, and, above all, Bouasse and Carriere, in 1903, have, along with others, been pioneers in the study of hysteresis. These workers found that the hysteresis diminished as the number of cycles increased, and finally reached an approximately fixed value. The difference between the first two cycles was greater than that between any other two. Schwartz found, in 1910, that the area of the loop became fixed sooner in a high grade than in a low grade of rubber. He also found that when cycles were generated to a constant final load, the increasing extension at the end of each cycle was proportional to the logarithm of the number of the cycle in question. Also, and naturally, these workers found that the shorter the extension the narrower was the hysteresis loop.

Another general rule laid down by Bouasse and confirmed by Schwartz is that the greater the speed of generation of the cycle the greater will be its area. You will at once appreciate the significance of this in regard to the internal heating of solid tires. Not only do excessive driving speeds multiply the number of hysteresis loops per second and, therefore also the heat liberated, but they also actually increase the calories of heat generated *per revolution of the wheel.*

One aspect of hysteresis is at least encouraging, viz., that the area of the loop diminishes with increased temperature. We may be thoroughly thankful that the converse is not the case. Our solid tires and the breaker strips in our pneumatic casing would go to pieces in no time if there were not this compensating law. Incidentally this temperature relationship strongly suggests the resemblance in many respects of rubber to a viscuous liquid. In fact, Shedd and Ingersoll use the term "viscosity loop" rather than hysteresis loop for this reason.

Thermal Phenomena

We shall now consider briefly some of the remarkable thermal phenomena associated with the mechanical working of rubber. Away back in the year 1805, Gough recorded in the memoirs of the Manchester Literary and Philosophical Society, that when he stretched a strip of rubber and held it to his lips it felt warmer than before stretching. Page, in 1847, made the same observation. Finally Joule also recorded the fact that while metals and other materials cooled on stretching, rubber, on the contrary, warmed. Lord Kelvin applied Le Chatelier's principle of equilibrium and predicted that if this was so, stretched rubber must contract on heating. Joule confirmed this by actual experiment, and the effect is now generally known as the Joule effect. Interestingly enough, the very first stages of extension are accompanied by a slight cooling effect. The corresponding cooling which accompanies retraction of the stretched rubber is definitely less than the heating effect on the extension. This difference representing the net increase in thermal content of the sample is the exact equivalent of the hysteresis loop, to which I have already referred. This heat must be attributed to internal friction in the rubber.

It may be of interest to compare the thermodynamical behavior of vulcanized rubber with that of better understood systems. *Gases* when expanded or compressed isothermally develop pronounced thermal effects. In fact, the energy expanded during compression, for example, is all turned into heat. *Steel springs,* on the other hand, are examples of systems which develop practically no thermal effects when deformed. All of the work done on the system appears as potential energy of strain.

Now vulcanized rubber is intermediate between a gas and a steel spring. When rubber is stretched the work done turns partly into potential energy of strain and partly into heat. In the case of an ideal rubber or compound (i. e., one which shows complete reversibility), *all* of the heat liberated during extension will be reabsorbed during retraction and likewise all of the work done will be regenerated, thus leaving the sample in the same thermal as well as mechanical state as it was before stretching. Such a rubber would not heat up in a casing or solid tire any more than would a perfect gas, when alternately expanded and compressed. There would be no hysteresis. Actually, of course, the heat is not completely reabsorbed and the energy is correspondingly reduced. It is thus convenient to keep in mind the two thermal values involved in any cycle of extension and retraction, viz., QR or Reversible heat and QF or Frictional heat, which is non-reversible and which accumulates when a rubber article is subjected to repeated strains.

The production of rubber compounds and cures for which QF is a minimum should be one of the focal researches for us all. The profound effect of mineral additions upon this quantity is already a part of technical knowledge. The fundamental reasons for this inter-relationship are deserving of our best thought. They lead us into the arcana of rubber structure.

Inversion Points

In 1898 Lundal discovered that if a given load was applied to a rubber sample under gradually increasing temperatures there was one temperature at which the addition of the load in question would cause no heating, and in fact above which it would produce cooling. Conversely at any given temperature he found that there was a critical load at which there would be no thermal effect. The lower the temperature the lower was the value of this critical load. Thus in a particular example raising the temperature from 18 deg. C to 58 deg. C increased the critical load from 44 to 102 grams.

The technical importance of these points of inversion in the Joule effect is manifestly very great. Suppose, for example, we could so adjust the thickness of the friction and skim coat between the plies of fabric in our casings as to bring the actual strains on the gum stock in actual service on the road to the critical point of inversion. Under such conditions there would be no thermal effect, no heating up of the stock, no perishing, no ply separation. Obviously it will be worth millions of dollars to our industry to conduct a successful research along the lines of determining the situation of these critical or neutral points as the state of cure and composition of the various mixtures are systematically varied.

Cause of Joule Effect

Some interesting conjectures as to the ultimate structure of rubber were advanced in connection with attempted explanations of the Joule effect. Govi, in 1867, suggested that rubber consisted of a sort of solid foam, made up of innumerable cells filled with gas. When the rubber is stretched the cells lengthen out. When heat is then applied, the gas expands and urges each cell to resume its original spherical shape. Subsequent experience showed the impossibility of this hypothesis.

A more plausible theory is that of Fessenden, who pictures rubber as composed of cells with solid envelopes and containing a viscous liquid. There is strong collateral evidence that this is a highly stimulating hypotheses of rubber structure. It applies equally well to other colloidal gels which display similar negative temperature coefficients when in a stretched condition.

Another explanation of the Joule effect is that of Schmulewitsch, which assumes that the shortening of the stretched rubber is due to an increase in the elastic modulus with increasing temperature. However, later work, in particular by Bouasse, disproved this theory and showed in fact, that Young's modulus grew smaller with increased temperature.

Time will not permit of reference to some other fascinating phenomena related to the stress-strain properties of rubber, such as electro strieture or the mechanical movements of stressed rubber under the influence of an electrostatic field, the phenomena of Double Refraction, and of selective spectral absorption. For a discussion of these and many other matters, I would refer you to a forthcoming volume by Prof. G. S. Whitby of McGill, whose advance manuscript was very kindly

loaned by the author and to which I am indebted for the major part of the historical matter referred to.

Schidrowitz, on Testing of Crudes

Coming down to more recent work, you are doubtless all familiar with the Schridowitz method of comparison of crudes by means of their stress-strain curves. The secrecy

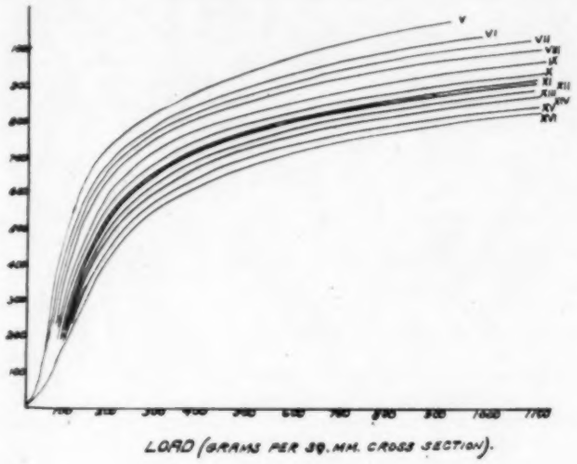

FIG. VI.

which for about five years has surrounded his methods has only recently been lifted and we are now invited to follow his reasoning. Schidrowitz starts with several experimental findings:

He first notes that the stress-strain curves for the same mixing, but with advancing cures, come regularly down the paper and never intersect. The stiff parts of the curves are moreover parallel to each other.

Second, the inclination or slope of the final part of the curve is an index of the quality of the crude rubber under test. The flatter the curve, i. e., the less the slope, the better the crude as ordinarily estimated.

Schidrowitz thereupon set himself the task of giving precise mathematical expression to these facts. Being rusty in his mathematics, he invoked the aid of Mr. Emil Hatschek, one of the best living colloidal chemists. Hatschek studied the trend and general character of the curves and found that they could be made to fit in with the interesting family of curves known as Conchoids, the polar equation of which is $(R + B \cos \theta = A$.

Figure VII, taken from the original paper, shows the same curve referred to Cartesian co-ordinates, in which case the equation becomes:—

$$y = a - b \sin \alpha$$
$$x = n\ (\ a \cot \alpha - b \cos \alpha)$$

For details of the transformation, reference should be made to the original paper. The three constants which govern the trend of these curves are a, b and n.

a, the distance from the pole to the asymptote has, in a general way, the effect of opening out the scale of the curves. Using Hevea rubber and an 8 per cent pure gum mixing, Schidrowitz found that he could get curves to fit properly if a were made equal to 10.5 on the elongation scale.

b, the distance between the origin of the curve and the asymptote clearly represents the utmost possible elongation of which the rubber would be capable if its stress-strain curve could be extended to infinity.

An Explanation of Figure VIII

In order to explain how the changes in the constants a and b, affect the position of the conchoid curve, we have drawn a series of curves with $a = 7\frac{1}{2}$, varying b from 1 to 12. Keeping in mind that in order to compare the position of the curve with the crude rubber curve, the origin must in each case be brought to the same point, we see that with very low values of b, the curve lies low down on the paper. As b is increased, the curves move upward exactly as do the curing curves shown in Fig. VI. The final parts of the curves also remain parallel. When b is made greater than a, loops are developed, and by suitably selecting the origin, the curves can be brought still higher up. In other words, the position of the crude rubber stress-strain curve, varying as it does in accordance with the cure, can be duplicated in the case of the

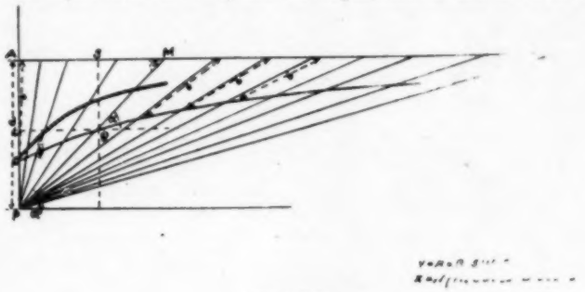

FIG. VII.

conchoid series by increasing or diminishing b. It is, however, noteworthy that points of inflection only appear when b is

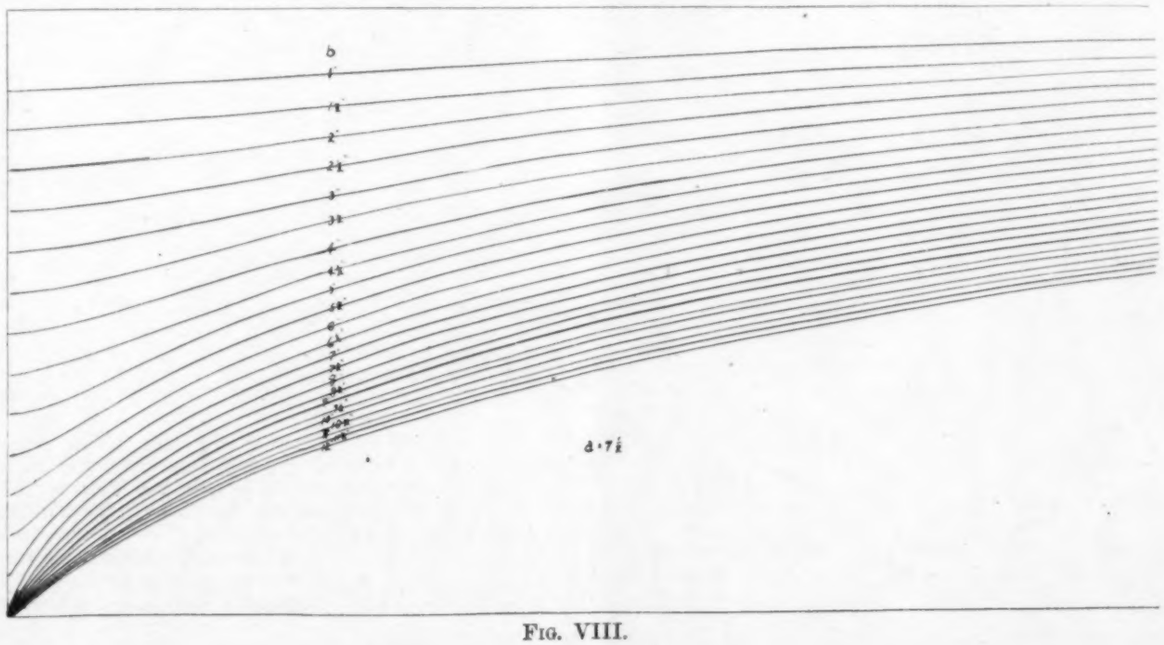

FIG. VIII.

less than *a*. When *b* equals *a*, a cusp is generated, and when *b* is greater than *a*, a loop. These conditions do not find any precise counterpart in the crude rubber curves, and to this extent the conchoid analogy falls down.

If *b* is fixed and *a* is decreased, the effect is to flatten out the curve corresponding to a stiffer rubber. For this reason

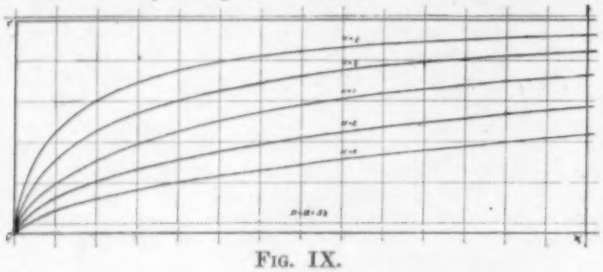

FIG. IX.

Schidrowitz regards *a* as a measure of the toughness or "tenacity" of the sample.

In Figure IX is shown the effect of changing the third constant "*n*." When *n* is .5 the abscissa (or load) corresponding to a given ordinate (extension) is cut in two. In other words, the extension per unit load is twice as great. At the same time that part of the parent conchoid which is approaching the asymptote is drawn in twice as close to the origin. Thus as *n* decreases, the slope of the first part of the curve is increased whereas the slope of the final part of the curve is diminished.

Now it is actually a fact that the higher the grade of a plantation crude the flatter will be the final part of its curve. Consequently Schidrowitz has definitely adopted *n* or in fact the product "*an*" (since *a* is constant for any set of curves) as the numerical index of the type. For convenience he actually measures the slope by taking two points well on in the curve and noting the change in the elongation. He finds that any given grade of crude will yield a fixed and constant value for "*an*" or type. A high grade first latex will give the figure 33. A weak off grade sample will go as high as 45.

The Perfect or Correct Cure

The most startling part of Schidrowitz's paper is his mathematical definition of the correct cure. You will recall that as the cure advances the curves come down to the paper in parallel fashion. The slope is fixed. That is the constant "*n*" is fixed. Now "*a*" is experimentally found to be constant at 10.5 on the elongation scale. Consequently the only thing left is to change "*b*." Schidrowitz states that the correct cure is the one when "*b*" equals "*a*." "*a*" represents toughness. "*b*" represents maximum extension. Obviously, says Schidrowitz, when these two quantities equal each other the rubber will be properly balanced as to physical properties, and this must correspond to the correct cure!

I think that you will agree with me that the reasoning behind this sweeping statement is just a bit inadequate. This should not worry us, however. The fact is that Schidrowitz checked up these "perfect" cures against the orthodox criteria of optimum tensile strength or optimum tensile product, and found he was not very far out. The whole work is very ingenious and doubtless the type or slope index will meet with wide adoption. As regards the "perfect"" cure, I think most of us will adhere to our present criteria rather than trust entirely to the conchoid constants *a* and *b*.

(To be concluded)

Notes on Rubber from Hevea Confusa

By B. J. Eaton

A small sample of a tacky rubber said to be from a species of the Para rubber tree known as *Hevea confusa* was received at the Department of Agriculture from the Director of Gardens, Straits Settlements, during 1918.

Chemical examination of the sample gave the following results:

Mineral ash	1.00 per cent
Resin (acetone extract)	1.90 per cent
Proteins ($N \times 6.25$)	2.20 per cent
Caoutchouc (by difference)	94.90 per cent

It will be seen from the above results that the sample did not contain an excess of resins; in fact the resin content may be described as low. The soft, tacky and non-resilient character of the sample is therefore not due to resins and is due almost entirely to the presence of a degraded caoutchouc. It would appear therefore that this species does not yield the true caoutchouc present in the latex of *Hevea brasiliensis*. The problem, however, requires further investigation, including chemical examination of rubber samples, combined with vulcanization tests, in order to correlate, if possible, the results of vulcanization tests with the composition of the rubber. Unfortunately, the sample received was too small for vulcanization tests. In *The Gardens' Bulletin, Straits Settlements*, Vol. II, No. 4, a description of the tree is given by Mr. Burkill, Director of the Gardens. In the same Bulletin, Vol. II, No. 6, a further note by Major Chipp, Acting Director of Gardens, is of interest and contains a letter from Prof. J. B. Harrison, Director of Science and Agriculture, British Guiana, which reads as follows: "Your records will show you that about 1910-1911, I wrote to your gardens seeking information about the seeds of *Hevea confusa* sent there from here about 1898-1900. Will you kindly inform Mr. B. J. Eaton that his analytical results on the rubber fully confirm those obtained here about 1910-1911 during the large scale tappings of *Hevea confusa* trees in our forests. We showed the *confusa* rubber at the Rubber Exhibition of 1911. When the soft rubber is kept for a length of time it very slowly gains resiliency and finally resembles slightly tacky or very inferior rubber from *Hevea brasiliensis*. Towards the end of 1910 the *Hevea confusa* rubber was valued in the United States of America at, approximately, 66 per cent of the then price of Hard Para rubber. Some hundreds of pounds were said to have been used in the factory tests. It was, I believe, finally used as an ingredient in mixings for vulcanite.

"*Hevea confusa* has proved to be a most objectionable tree. Experience has shown that cross-fertilization between *Hevea confusa* and *Hevea brasiliensis* readily takes place, but worst of all, it appears in the Guianas to be the forestral host plant of the organism giving rise to the leaf-disease of Para rubber, which disease has practically put an end to the chances of successful Para rubber cultivation in French and British Guiana."

The inferiority of the rubber from this species is therefore well known. It appears probable therefore that conditions might exist or be produced which would give rise to a mixture of polymers of caoutchouc in the latex of any rubber tree and the inferiority of a few samples of rubber which have been tested, and which were known to have been satisfactorily prepared, may be due to physiological conditions, at present unknown, which have produced a mixture of such polymers.

* Agricultural Bulletin of the Federated Malay States.

Investigations on Different Coagulants*

By Dr. O. De Vries

Though the large majority of rubber estates nowadays use acetic acid as a coagulant, it may have some importance to review the data we obtained in the investigation of other coagulants, especially those which drew attention during the war, when acetic acid was scarce and high in price. Of several coagulants we have investigated also the influence when keeping either the raw rubber, or the vulcanized product, during periods of one to three and a half years.

Sulphuric Acid

Sulphuric acid has been in use on several estates in the beginning of the war, but as far is known not with members of our station. It is a strong and cheap coagulant, which furthermore can partly or wholly replace the anti-oxydant (sodium bisulphite). Small quantities used for coagulation do not give large deviations in properties of the rubber, but as soon as the dose is taken somewhat large, the rate of cure and viscosity of the rubber decrease markedly, and much more rapidly so, than when using corresponding doses of acetic acid. When using somewhat too large, though by no means abnormal portions, an abnormally slow vulcanizing rubber is obtained. The uniformity in rate of cure of the product will therefore, be more difficult to preserve when using this coagulant, as variations in the dose used for coagulation may always occur in practice.

A practical drawback is that sulphuric acid strongly corrodes the iron of the rolls, the floor of the factory, etc.

Alum

Alum was tried as a coagulant on some estates in the beginning of the war, but only on an experimental scale. It is, however, very largely used by native planters. Coagulation proceeds best with undiluted latex, in which 3 to 4 grs, per liter would be sufficient, whilst 8 to 12 grs. give a rapid coagulation. Small quantities of alum cause a marked decrease in rate of cure and viscosity, whilst larger doses (such as are often used to obtain rapid coagulation)give an abnormally slow curing rubber with a low viscosity. The tensile strength shows no marked deterioration, no greater than might be expected to be caused by the much longer time of cure. The slope decreases (ameliorates) somewhat by larger doses.

Acetic Acid from Wood or Alcohol

The manufacture of crude acetic acid, which was studied extensively in the F. M. S. by Eaton and Whitby, was also tried in Java. The acid obtained by wood-distillation had the drawback that the tarry substances were difficult to remove completely, so that crepe could not be prepared with it, and even the color of sheet became too dark, so that eventually the market price decreases more than was spared in cost of acetic acid. Acetic acid prepared by fermentation of alcohol is cheap and a good coagulant, but its preparation requires some care and supervision. Commercial acetic acid, if cheap enough, is therefore preferred. The crude acids give rubber of practically the same properties as the pure commercial acid.

Fermented Coconut-Water

The juice from coconuts, on fermentation, gives an acid sap which was used on some estates as a coagulant, and proved satisfactory. Transport of this dilute acid fluid, is however, too expensive, so that it only can be used on estates growing both rubber and coconuts. As the fermentation in closed bottles is regular and sure, this coagulant deserves attention for native planters, and is much to be preferred above alum.

Acid Coffee-Juice

The acid juice that is obtained when the fresh red coffee berries are left to ferment for some days in water was tried as a coagulant, but as it has a dark red color crepe cannot be prepared with it, and sheet also takes a darker red tint than usual. The properties of the rubber from some experiments seemed to be injured somewhat, and as this coagulant would be only available during the few months of the coffee harvest, it is not likely to gain any practical importance, and was only tried as an experiment in times of need.

Acid Water from a Crater-Lake

In the East of Java the volcano Idjen has a lake which contains an acid water, which was also tried as a coagulant. It has a strong coagulating power, containing alum, sulphuric and hydrochloric acid. Its composition is very varying, according to the depth from where it is scooped, the dilution of the upper layers by rain, etc., as might be expected, it proved injurious to the properties of the rubber, especially when used in larger quantities. We mention our results as a curiosity, and to give a striking example of deterioration by using a harmful coagulant.

Alcohol and Denatured Spirits

The above were also tried as coagulants. Coagulation is quite different from ordinary acid-coagulation, as it is instantaneous. Where the alcohol mixes with the latex it forms a clot, and no further coagulation of the remaining latex occurs. Only strong alcohol and undiluted latex can be used, else the quantities of alcohol become much too large. For complete coagulation with a clear serum, per liter of latex 500 cc. of alcohol are needed; but 250 cc. are sufficient if one leaves the mixture overnight, the milky serum then being coagulated by the alcohol gradually diffusing from the already formed clots. The costs of this coagulant are some 10 times as high as acetic acid, even when using denatured spirit, free from duty. Fermenting the alcohol would be a much more economical procedure. Alcohol has, however, some advantages for trial coagulations and experimental purposes, as it gives a rapid and complete coagulation, and has not to be dosed, provided enough of it is added.

Coagulation by alcohol was found to leave the rate of cure unchanged, whilst the slope was always found higher (less) and the viscosity mostly lower. The tensile strength remained unchanged, or became somewhat less (by denatured spirit); the ash-content was higher (0.3 to 0.4 against 0.2 per cent) The increase in weight was only 0.4—0.5 per cent. These data are interesting, because from them it may be followed that only a small portion of the serum substances is precipitated by the alcohol, and these of such a nature that they do not produce an increased rate of cure of the rubber.

The very irregular, clotty coagulum has, of course, always to be made into crepe, and cannot be sheeted. The crepe dries slower than the control.

Formic Acid

Formic acid, as chemically related to acetic acid, was many times recommended and tried as a coagulant. Considering its price and coagulating power it might be a good substitute, but it seems to be irregular in composition, perhaps sometimes containing formaldehyde, and gives irregular results, notably sometimes a marked decrease in rate of cure.

Lactic Acid

Lactic acid has no importance as a coagulant in practice, as it is too expensive, but since this acid is formed in most fermentation processes, and plays a role in spontaneous coagulation, and in different fermented saps such as the fermented coconut-water treated above, some experiments were made with it. The properties of the rubber were found to be unaltered, except for a small decrease in rate of cure.

Hydrochloric Acid

Hydrochloric acid was tried in one experiment. A strong dose retarded the cure very much, though somewhat less than an equivalent dose of sulphuric acid, whilst viscosity and tensile strength deteriorated markedly and the slope became somewhat better. On keeping two years, the sample became tacky, and could no more be vulcanized, whilst the viscosity decreased to a very low figure. The samples prepared with strong doses of acetic and sulphuric acid had remained unchanged in appearance, though the viscosity had changed.

* Communications of the Central Rubber Station. *India Rubber Journal*, London, England.

Rubber Association Holds Outing

Nineteenth Annual Summer Outing of Organization Held at Gedney Farms Hotel, White Plains, N. Y., an Unqualified Success—Golf and Tennis Tournaments a Feature

One of the most thoroughly enjoyable events ever held in the history of the rubber industry took place on Wednesday, July 28th, when three hundred and fifty members of the Rubber Association of America together with their guests attended the nineteenth annual summer outing of the organization which was held at the Gedney Farms Hotel, near White Plains, New York. Location, weather, refreshments and the thousand and one things which go to make an affair of this kind successful combined to make the event one to be long remembered in the minds of all of those who were fortunate enough to be in attendance.

GEDNEY FARMS HOTEL, WHITE PLAINS, N. Y.

Wednesday morning, July 28th, dawned without a cloud in the sky and it was not long before the rubber men were on their way to the scene of the day's pleasure. Excellent train service made it possible for those who elected to go by rail to put in an early appearance. Many however, made the trip from New York by motor and long before noon the driveways leading to the hotel were thronged with cars belonging to the members of the association.

Sports were the order of the day and it would be difficult to find a place provided with better facilities for the enjoyment of the athletically inclined. An excellent eighteen hole golf course, tennis courts, swimming pool, bowling alleys and billiard tables furnished the means by which almost any whim connected with the realm of sport could be gratified.

The Golf Tournament

Shortly after 10 o'clock the golfers repaired to the golf course which was situated but a short distance from the hotel and began making the rounds of the course. The golf committee had arranged a handicap tournament open only to members of the association with prizes for low gross, first low net and second low net scores. Entries were divided into Class "A" and Class "B" according to the extent of the handicaps allotted to the participants. As the golfers came in from the final hole they proceeded to the putting green near the club house where a putting contest was held. This feature was open to both members and guests.

The Tennis Tournament

In the meantime a tennis tournament was under way in the courts at one side of the hotel. It had been the original intention to hold an inter-firm doubles tournament but this idea was abandoned and the players paired off as they entered the contest. In addition to this a singles tournament was also held. Some excellent playing was witnessed and the general impression was that the rubber men did not give all their attention to business during the summer months.

The fifty foot swimming pool adjoining the hotel proved an exceedingly popular attraction for those who desired to keep out of the sun's rays while the bowling alleys and billiard tables also received their quota of enthusiasts.

Shortly after 1 o'clock a luncheon consisting of cold bullion, cold cuts, potato salad, ice cream and iced tea was served in the banquet hall of the hotel. While the luncheon was in progress an orchestra entertained the diners with a number of jazz selections in addition to a number of popular numbers. The rendering of "How Dry I Am" was accompanied by a chorus of groans from those whose memories carried them back to the dim, distant days when the Eighteenth Amendment had been a thing unthought of and when water had fewer uses than it has at the present day.

After lunch the golf and tennis tournaments were resumed and the pool became crowded once more.

The Baseball Game

During the afternoon a baseball game took place between teams representing the rubber manufacturers and the rubber importers. The game which was umpired by H. W. Jenkins, of the New York Insulated Wire Co., was won by the manufacturers by the score of 9 to 7. The battery for the manufactures was Flint, of the Rubber Association of America, pitcher, and S. S. Scranton, of Katzenbach & Bullock, catcher. M. Millenthal, of Edward Maurer Co., and C. P. Bouton, of C. T. Wilson Co., were the points for the importers.

In addition to this a water polo game between two picked teams also took place during the afternoon.

Shortly after 7 o'clock one and all repaired to the banquet hall where an excellent dinner was enjoyed. During the progress of the dinner the orchestra once more entertained with jazz selections and many of the recent song hits from Broadway.

When the coffee and cigars had been served a long table on which reposed the prizes was brought into the hall and the awards were made.

In the golf tournament the prize for Class "A" low gross score, a handsome pigskin golf bag, was won by W. W. Yule of the Falls Rubber Co., Cuyahoga Falls, Ohio, with a score of 79. A handsome mahogany mantel clock was the prize for the first low net score and was won by W. E. Kavenaugh, of the Plymouth Rubber Co., Canton, Mass., with a score of gross 93, handicap 20, net 73. E. H. Sprague, of the Sprague Tire & Rubber Co., Omaha, Nebr., won two thermos bottles in leather cases as the prize for second low net score of 86 gross, 10 handicap, 76 net.

SCENE ON TENNIS COURTS DURING THE TOURNAMENT

SOME OF THOSE WHO ATTENDED THE NINETEENTH ANNUAL OUTING

In the Class "B" divison, first prize for low gross score, a black leather golf bag, was won by A. D. Lown with a score of 103. First low net prize, a silver smoking set was won by E. P. Gwillim with the score of 103 gross, 26 handicap, 77 net. Second prize for low net score in this class consisting of a dozen golf balls went to H. Hardenburgh who turned in a score of 103 gross, 23 handicap, 80 net.

The putting contest was won by F. A. Goddard, of the Sterling Tire Corporation, Rutherford, N. J., and consisted of a leather pocket cocktail case. Second place resulted in a tie between D. A. Paterson, of Balfour-Williamson & Co., and P. E. Young. Mr. Young won the toss and also the prize which was a handsome silk umbrella.

In the tennis tournament the doubles prizes consisting of leather, gold-mounted pocketbooks went to S. H. Johnson, of J. H. Lane & Co., and H. G. Smith, of the United States Rubber Co., who won by the scores of 6-3, 6-4, from D. S. Kubie, of the Raw Products Co., and H. P. Farrington, of the Penninsular Trading Agency. The runners-up received silver-buckled belts. First prize in the tennis singles was won by E. H. Baker, of W. H. Bass & Co., from H. G. Smith, of the United States Rubber Co., 6-3, 6-4. Mr. Baker won a leg on the silver perpetual challenge cup, donated by the Rubber Association of America to be won three times, and also received a leather gold-mounted pocketbook. Mr. Smith received second prize, a silver-buckled belt.

Following the awarding of the prizes the gathering broke up and one and all wended their respective ways in the direction of Manhattan.

The committee in charge of the outing consisted of A. H. Brown, George A. Ludington and W. O. Neil; sub-committee for golf, A. H. Brown and R. L. Chipman; sub-committee for tennis, Roger S. Hardy and Harold French. General Manager A. L. Viles and Assistant General Manager Wilson, also performed wonders in making the outing a remarkable success.

Tire Executive Committee Meeting

The July regular meeting of the Tire Executive Committee of the Rubber Association of America, was held at the Rubber Association office on Thusrday, July 29th, and several interesting subjects were given attention.

Prominent among the matters discussed was the desirability of action by tire manufacturers in this country in the direction of promoting the use of the straight side type of tire instead of the clincher in Continental Europe and England in which connection it has been suggested that co-operation could be arranged between leading British tire manufacturers, who have already started work in this direction, and the tire manufacturers of the United States.

Several subjects connected with the effect of existing or contemplated state legislation concerning the interests of motor vehicle and tire manufacturers were discussed, among which the laws of several States aimed at the regulation of truck loading according to road surface contact of tires was particularly of interest.

It had been suggested that there is a field for very valuable and useful work in the direction of the development of standard system of accounting for retail tire dealers such as has been undertaken by the Harvard Bureau of Business Research, for instance, for other retail industries. The development of the standard system of accounting, however, would be incidental to the primary purpose of the work which would be to accumulate and distribute accurate information concerning operating costs in the retail tire trade. The matter was the subject of an interesting discussion and in conclusion it was understood that the management of the Association would develop additional information which would permit of further consideration of the suggestion on a more definite basis.

The following bulletin has been sent out to rubber manufacturers:

JULY 31, 1920

To Rubber Goods Manufacturers:

As a matter of information there is reproduced in the following, a communication which has been addressed by the Grasselli Chemical Company, Cleveland, Ohio, to a considerable number of rubber goods manufacturers:—

Your attention is called to the following important patents:

Hofman and Gottlob 1,126,469 Jan. 26, 1915 . Vulcanization of Rubber and Production of Vulcanized Rubber Products.

Hofmann and Gottlob 1,149,580, Aug. 10, 1915. Caoutchouc Substance and Vulcanization Product Thereof.

Both of these patents are assigned to The Grasselli Chemical Co., a Corporation of Ohio. They cover the use of hexamethylenetetramine, aldehyde ammonia, aldehyde derivatives, and other chemical substances, as promoters of vulcanization and improvers of vulcanized articles, being what are commonly known as rubber accelerators. The right to sell any of the above substances, or any chemical substance coming within the scope of the above patents, to manufacturers of vulcanized articles to be used in the process of producing vulcanized rubber is limited to our licensees.

Your attention is directed to the above patents, so that you may avoid any infringement of our rights.

Any inquiry in regard to these patents should be directed to the Legal Department of the Grasselli Chemical Co., Guardian Building, Cleveland, Ohio.

Yours very truly,

The Grasselli Chemical Company
By E. R. Bailey, Secretary.

Federal Builds in San Francisco

The completed plans for the $125,000 five story reinforced concrete building to be erected for the Federal Rubber Company on the west side of Second street, San Francisco, were sent East some time ago for approval by Architect E. G. Garden. The structure will be 98 by 137½ ft., and will be connected with the railroad tracks by a spur, will contain two freight elevators, will have commodious offices on the second floor and be modern in every respect.

News From the Rubber Metropolis

Tire Production Decreased—B. F. Goodrich Co. Announces Profits—Rubber Men to Discuss Safety—Sale of Goodyear Stock Closes—Akron Stock Prices

Tire Production Decreased

(Special Akron Correspondence)

The low ebb in tire production in the rubber factories of the Akron district has been reached, according to officials of companies who are in close touch with all conditions which brought about the rather sudden slump in the industry.

It is probable that tire production will remain at the present low mark until the present manufactured surplus is absorbed and the demand again approaches normal. The best estimates place this low production period at from four to six months.

All manufacturers admit that the industry is rapidly approaching that point where the only manufacturer who will succeed is the one who gives the best value and service and can best meet competition.

It is estimated that the slump in the tire business has resulted in the laying off of at least 30,000 workers in the rubber factories of the Akron district. Akron once the "city of standing room only" is now placarded with "rooms for rent" signs. Houses, however, are not vacant as the city was so densely populated that the exodus of 30,000 rubber workers simply relieved the crowded conditions and gave thousands of families a chance to stretch themselves in quarters formerly occupied by roomers.

The slump, however, hit some sections of the town hard and so many and varied were the rumors that the Wingfoot Clan, factory organ of the Goodyear Tire & Rubber Co., printed an editorial in which business conditions were discussed for the benefit of workers holding stock and business men in East Akron.

This editorial which has been given wide publicity, follows in part:

A temporary surplus of finished tires on the market plus the restriction of credit to manufacturers and dealers has forced a curtailment of production until the surplus is absorbed.

There is no likelihood of a let-up in credit restrictions until November 1 when the crops of the nation have been harvested. The surplus of tires is being rapidly absorbed as more tires are being consumed now than are being produced.

The factors in the tire surplus are:

A record breaking winter, a rainy spring and a backward summer resulted in less tires being used than normally.

The railroad strike tied up finished products at the factories.

Dealers who had bought considerable stocks of tires during the winter faced on May 1 a Federal Reserve Bank ruling that their notes given in payment would not be renewed and that new credit for additional purchases would not be granted.

Automobile manufacturers faced a similar situation as regards a curtailment of credit and were forced to cut down production and to delay delivery of tires already ordered.

In the meantime the inventory of raw materials at the factories was increasing rapidly due to orders for rubber, fabric, and the like, placed many months ago, further complicating the production and financial situation.

It is probable that the low-water mark in tire production has been about reached and that it will stick at this point until the tire surplus is absorbed and the plant can start the swing upward again.

We are coming to a time when the only tire manufacturer who will succeed is the one who gives the best value and service and can best meet competition.

The market price of stock will vary with people's need of money and their belief in future prospects. The important thing, however, is the amount of assets behind any issue of stock. Goodyear with an established world-wide market with an excess of $125,000,000 assets over liabilities, or a ratio of four to one, with a tremendous good will based on the good opinion that the world has of Goodyear products and service and people's willingness to buy Goodyear products because of their confidence in them, stands in excellent position to meet the present conditions.

Goodrich Announces Profits

(Special Akron Correspondence)

Profits of the B. F. Goodrich Co. are running at the rate of $15,000,000 for the year, somewhat below the figure of $17,000,000 reached in 1919, according to a statement recently issued by the company.

The net profit for the first half year after making full provision for maintenance charges, depreciation, interest on borrowed money, doubtful accounts and all outstanding liabilities, but before providing for federal taxes was approximately $7,600,000.

The Goodrich increased interest charges by issuing $30,000,000 in seven per cent five-year notes. The company is benefitting from this timely financing although profits are not running quite as high as during the record year of 1919.

Directors have declared the regular quarterly dividends of 1¾ on preferred and 1½ on common, preferred payable October 1 and common November 15.

Dunlop Tire Inspection

A formal inspection of the new automobile tire building of the Dunlop Tire & Rubber Goods Co., in Buffalo, N. Y., was made by a deputation of the directors a short while ago.

The building extends from Queen Street to Natalie Avenue, along Booth Avenue, and will be entirely devoted to the making of Dunlop Cord Tires.

Rubber Men to Discuss Safety

The Rubber Section of the National Safety Council will consider safety problems of especial interest to the industry at a section conference to be held September 29 to October 1 in connection with the national session of the Council to be held at Chicago.

Among the topics for discussion will be: "The Present and Future of Safety in the Rubber Industry", Chairman S. M. Schott; "Health Hazards", J. H. Horan, Hood Rubber Co.; "Making Mills and Calenders Safe", C. B. Mutchella, B. F. Goodrich Co.; "Handling Materials", F. B. Martens, Firestone Rubber Co.; "Vulcanizing Apparatus", F. Scott, Hamlin & Co.; "Industrial Sanitation", W. N. Fitch, B. F. Goodrich Co.; and "Teaching Safety in the Factories", H. T. Martin, Fisk Rubber Co. An address will be made by Vice-President J. N. Gunn of the United States Rubber Company on the opening day of the section meeting, and by A. A. Frank, factory manager of the Federal Rubber Company, on the last day.

Sale of Goodyear Stock Closes

Sale of the Goodyear Tire & Rubber Co. issue which closed July 15 exceeded $26,000,000, President F. A. Seiberling announced recently. The stock was offered in units of three, two shares of preferred and one of common for $300 and its heavy subscription in this market is considered one of unusual success by financial men.

Mr. Seiberling's statement concerning the sale of the stock follows:

"The unsold portion of recent offering of $30,000,000 of Goodyear stock was withdrawn from sale at the close of business July 15, not including subscriptions in the mail from the Pacific coast. Tabulations made today show that more than $26,000,000 stock has been sold to more than 20,000 investors, distributed over every state in the Union.

Akron Stock Prices

(Special Akron Correspondence)

Following are the Akron rubber stock market quotations for August 2:

Amer. R. & T. com.	—	80
Amazon Rubber	—	95
Firestone T. & R., com.	120	128
do. 6 pct. pfd.	99½	93
do. 7 pct. pfd.	86	88
General T. & R., com.	—	700
do. 7 pct. pfd.	93	97
B. F. Goodrich, com.	54½	56½
do. 7 pct. pfd.	86½	87½
do. 5-yr. 7 pct. notes	93½	95
Goodyear T. & R., com.	112	114
do. 7 pct. pfd.	84½	85
India Rubber, com.	—	165
do. 8 pct. pfd.	—	80
Mason T. & R., com.	—	20
do. 7 pct. pfd.	65	70
Marathon T. & R. com.	45	50
Miller Rubber, com.	120	125
Mohawk Rubber	—	285
Portage Rubber, com.	75	80
do. 7 pct. pfd.	69	75
Republic Rubber com.	1½	2
do. 7 pct. pfd.	—	40
do. 8 pct. pfd.	20	25
Rubber Products	—	100
Star Rubber, com.	—	150
do. 8 pct. pfd.	—	100
Swinehart T. & R., com.	—	75
do. 7 pct. pfd.	69	80
Phoenix Rubber, com.	—	20
do. pfd.	—	90
Standard Tire, com.	—	175
do. pfd.	—	90

MARKETS

Manufactured Rubber Goods

NEW YORK, AUGUST 5, 1920.

Contraction of credits and a lamentable falling down in the freight service of the country have combined to cut production and rubber manufacturers who are desirous of keeping their plants running at capacity have been forced in many instances to suspend from time to time. In many instances, shutdowns have been enforced by the non-arrival of raw materials, held up on the railroads, in others, the shipping situation has prevented the distribution of manufactured goods. Manufacturers have also been embarassed for capital, as the result of working funds tied up on products of which shipment cannot be made as desired.

AUTOMOBILE TIRES

Rumors have been afloat in the trade to the effect that tire prices were to be reduced. There have been no indications from the manufacturers, in general, however, that such action is contemplated and it is even a question as to whether any contemplated price changes would be downward, conditions apparently justifying an upward revision, if any revision should take place. The large freight increase authorized by the Interstate Commerce Commission, and expected to be imposed shortly by the railroads, strengthens the latter belief.

EXPORTS

European importers are displaying more interest in the market for American tires, and considerable business is now going on, despite the unfavorable exchange situation. Tire factories in Europe are away behind in production, due to the interruption of their activities during the war. This condition is particularly true of factories in Germany, Belgium and France. American tire manufacturers are booking some business for shipment abroad.

BOOTS AND SHOES

Buying of rubber heels and rubber and composition soles is reported to be very active. The buying public in the United States is largely holding off from purchasing new shoes, preferring to have old ones repaired, and this tendency is booming the sale of rubber heels and soles.

MECHANICAL GOODS

The slackness which has slowed down activity in other lines is also being felt to some extent in the mechanical field.

No large buying of packing or belting is reported, activities being routine in nature in this branch of the market. No concerted buying of hose or coupling by the railroads has yet been reported, but small orders are being received, it is said. Marine specialties are moving fairly well.

MISCELLANEOUS

With sugar prices weakening, the outlook for the home canning season this year is distinctly more favorable, and manufacturers of rubber jar rings are anticipating a better demand for their product than was the case last year. Summer lines of rubber goods, such as bathing caps, ear drum protectors, rubber lined bathing bags, etc., are about through. There is the usual good demand, however, for rubber toys, balloons, and advertising novelties. The sale of newly-produced foot brake pads, and other such appliances for automobiles is reported to be picking up as new lines are constantly appearing on the market.

Cotton, Yarns and Fabrics

NEW YORK, AUGUST 5, 1920

The cotton market for the past week or so has been more of a trade affair than for some time past. Under present unsettled conditions, many operators in the market prefer to sit outside and watch, rather than take their chances in the uncertain market now ruling.

Reports from the belt indicate that the crop has improved a great deal during the past fortnight, and a production of more than 12,000,000 bales is indicated should favorable weather conditions continue. Too much rain, increased insect damage, or an early frost might seriously cut this yield, however. Bull interests still in the market are basing their arguments on the possibility of crop damage from frost or excessive rains, the fact that cotton manufacturers have no big stocks of goods, and the need of the world for cotton goods. Bear factors, on the other hand, call attention to the money and credit situation which curtails holding of cotton on which money must be borrowed, lack of buying by spinners and dullness of cotton goods markets, and the possibility of a big production of low grade cotton, for which there is no demand at home and no market abroad, under present conditions. With buyers of cotton goods looking for a gradual downward re-adjustment of prices, well posted members of the trade say that it is hard to see 40 cent cotton during the coming season.

SEA ISLAND COTTON

Sea Island cotton is practically a dead letter, as far as the tire trade is concerned, and few dealers in fabrics pay any attention to the situation. The Sea Island crop of 1919 was only 6,916 bales, which compares with a crop of 117,559 bales in 1916. Damage by the boll weevil pests has apparently discouraged the growers so that the industry has been practicaly abandoned.

AMERICAN-EGYPTIAN COTTON

Growing of long staple cotton, undertaken in California as an experiment, has proved to be a success, and growers in the Southern part of the State plan to begin quantity production within the next few years. The industry in the Southwest is being steadily expanded, new land being brought under cultivation each season. Production in the Southwest is being expanded so rapidly that it is hoped to make the United States tire industry independent of the Egyptian cotton crop eventually.

EGYPTIAN COTTON

All records in the importation of long staple cotton have been broken this season in the importation of Egyptian cotton. Whereas in the season of 1918-1919 only about 80,000 bales of Egyptian cotton were imported into the United States, it has been authoritatively estimated that fully 300,000 bales will be brought to this country this year. The cotton is shipped from Alexandria to Boston and thence to the spinning mills. In view of the curtailed tire production and the increase in long-staple cotton growing in the United States, it is doubtful if 1920-1921 imports will equal this figure, however.

TIRE FABRICS

Demand for tire fabrics has fallen off to such an extent that the market is best described as "sick." With stocks of manufactured tires rapidly accumulating on their hands, tire manufacturers are not showing any desire to make further purchases of fabrics, and are showing but little interest in the market situation.

New England reports state that cancellations of orders for fabrics used in the manufacture of automobile tires have become so general that the spinners are offering much of this rejected fabric to manufacturers of rubber shoes. In the face of these conditions, the market is naturally showing an easier tendency, and goods are now obtainable in quantities on spot.

DRILLS, SHEETINGS AND OSNABURGS

Tire manufacturers are showing little or no interest in this branch of the market, and many orders have been cancelled, manufacturers having no need for the goods. The market is in an easy position, due to heavy offerings. Speculative interests unloading in the market at the present time are underselling mill men by as much as 2 cents per yard on many constructions, and find it difficult to put through transactions even at these low prices.

HOSE AND BELTING FABRICS

Weakness in cotton goods is now being felt in this market, but as there has been no overproduction to speak of, the declines have not been sharp and the market is still controlled to a large extent by first hand sellers. Single filling ducks are off 2 to 3 cents per pound, with double filling 2 to 2½ cents lower. Shoe ducks, however, are stronger, advancing 6 cents to 98 cents per pound. Hose, belting and enameling ducks continued quiet and unchanged.

TIRE FABRICS

17¼-ounce Sea Island, combed, sq. yd.	Nominal
17¼-ounce Egyptian, combed	2.35@2.50
17¼-ounce Egyptian, carded	2.25@2.40
17¼-ounce Peelers, carded	Nominal
17¼-ounce Peelers, combed	2.25@2.35

DUCKS

Belting (pound basis)	lb.	.80 @	.82
Hose (pound basis)		.80 @	.82
*Enameling		.95 @	—
Shoe Ducks		.98 @	—
Single filing	yd.	.33 @	.35
Double filing		.35 @	.38

*Price varies according to width.

DRILLS

37-inch 2.35-yard	yd.	.30 @	—
37-inch 2.75-yard		.22½ @	.23
37-inch 3.00-yard		.21 @	—
37-inch 3.25-yard		.20½ @	.20¾
37-inch 3.50-yard		.19½ @	.19¾
37-inch 3.95-yard		.16 @	—
37-inch 2.00-yard Southern		Nominal	
37-inch 2.00-yard Northern		Nominal	
40-inch 2.40-yard Southern		Nominal	
40-inch 2.40-yard Northern		Nominal	
52-inch 1.90-yard Southern		Nominal	
52-inch 1.90-yard Northern		Nominal	

SHEETINGS

40-inch 2.35-yard	yd.	Nominal	
40-inch 2.50-yard		.26½ @	.27
40-inch 2.85-yard		.24 @	—
40-inch 3.00-yard		.23½ @	—
40-inch 3.25-yard		.26½ @	—
40-inch 3.75-yard		.21 @	.22
40-inch 4.25-yard		.17 @	.17½

Note—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload Lots)

	Cents	Per	Yard
7 -ounce 40-inch	——	@	——
7½-ounce 40-inch	6.00	@	——
7½-ounce 45-inch	——	@	——
8 -ounce 40-inch	8.00	@	8.15
8½-ounce 40-inch	10.50	@	——
10 -ounce 36-inch	10.50	@	——
10 -ounce 40-inch	10.50	@	——
10 -ounce 45-inch	Nominal		
10½-ounce 40-inch	10.75	@	——

Chemicals and Compounding Materials

NEW YORK, AUGUST 5, 1920.

Slackening of demand on many lines has given added impetus to the downward trend of prices in this market, and practically all of the price alterations during the past fortnight have been to lower levels. Buying of chemicals by the rubber trade has fallen off to a considerable degree in sympathy with the curtailed production in the industry. Even with the quiet business now being done, it is still difficult for rubber manufacturers to get consignments of chemicals and compounding materials which were purchased some time ago in view of the freight congestion delaying many shipments.

The most marked exception to the general trend of the market has been in napthas. Strength has featured the market for all varieties of napthas, and prices have been increased rather than marked down. This strength, however, is in line with the bullish tendency of the oils markets.

EXPORTS AND IMPORTS

Foreign buyers are buying in small quantities, and American chemicals are entering markets never touched by this country previous to the war. General interest, however, centers in the import situation. Besides shipments of raw materials, Germany is now sending to this country manufactured chemicals and compounding materials.

LITHARGE

Continued strength is featuring the market for litharge, and prices are firmly held as quoted in the following table. Producers are somewhat behind in their orders and are endeavoring to catch up with their business, although they are hampered to a considerable extent by the shortage of freight cars in which to ship their product. Quantity prices are also unchanged.

LITHOPONE

No change in the quoted price of 8 to 8¼ cents for the current quarter of the year has been made. Demand has lessened somewhat with increased production, but producers are still booked up to capacity and turning down orders in some cases. Their output is being curtailed by difficulty experienced in getting barytes. Second hands are offering lithopone for prompt shipment, but asking prices show sharp advances over those which have been named by the producers.

WHITING

With demand keeping pace with the limited production, the market is being firmly maintained by producers. Some curtailment of operations is necessitated from time to time as producers find it difficult to obtain sufficient supplies of chalk, but manufacturers in general are working at capacity whenever possible to catch up with their business.

BARYTES

Prices are held unchanged by domestic producers. Operations in the South and Southwestern fields are being carried out on as large a scale as possible, but even with present increased production, the producers are unable to begin to catch up with their orders, and are not in the market for any new business. Those in a position to make re-sales of crude barytes for prompt shipment are able to get a much higher price than that quoted in first hands. Germany is offering considerable quantities of crude barytes for shipment here, but buyers are not showing much interest due to poor shipping conditions, which make the time of arrival extremely problematical.

DRY COLORS

Steady demand is reported in most quarters of this market. Blacks are being strongly held by leading producers as quoted below. The shortage of Italian Sienna has been relieved by heavy arrivals and producers of browns are now in a position to do more in this line. Domestic iron blues are strongly held at $1 per pound, but imported German stock has been offering at 85 cents. Other blues are steady. Greens and yellows are firm under a fair demand. Reds hold about steady.

BENZOL AND OTHER CRUDES

While contract prices remain unchanged at 33 and 35 cents per gallon, spot benzol is held at 33 to 38½ cents for the 90 per cent. and 35 to 40½ cents per gallon for the pure. Producers are not offering spot goods due to their having their production contracted for some time ahead. There is a strong export demand for benzol, but American producers are not in a position to book any of this business, and will not be until they have cleared their books of domestic business. Solvent naptha is strong and difficult to obtain in quantities. Phenol is showing an easy undertone, due to offerings here of goods from abroad. Xylol is strong under a steady routine call. Producers are not booking any prompt shipment business on toluol, being sold up ahead.

INTERMEDIATES

Demand for aniline oil has fallen off, but producers are holding the market steady, as they are able to dispose of any over-production to the export trade. Benzidine is being held at its present firm level, the market being in strong hands. Betanapthol is strong under light offerings. Demand for paranitraniline has fallen off somewhat, but producers are holding the market firm as they still have some back orders which remain unfilled. No change in paraphenylenediamine is to be noted.

Current Prices for Chemicals, Fillers, Colors, etc.

Acetone, carlots	lb.	.21 @	.22
smaller lots	lb.	.22 @	.23
Acetanilid, C. P., bbls	lb.	.60 @	.65
Acids, Acetic, 56 per ct.	cwt.	8.40 @	9.15
Carbolic, C. P.	lb.	.12 @	.20
Muriatic, 20 deg.	cwt.	2.25 @	2.50
Muriatic, 22 deg.	cwt.	3.00 @	3.25
Nitric, 42 deg.	cwt.	7.75 @	8.00
Nitric, 40 deg.	cwt.	7.00 @	7.50
Sulphuric, 60 deg. car lots	tons	17.00 @	19.00
Sulphuric, 60 deg. car boys		19.00 @	21.00
Tartaric, crystals	lb.	.76½ @	.77

Aluminum, Silicate	Nominal		
Aniline oil, bulk basis, Contract	—	@	—
Imported	Nominal		
Domestic	.32	@	.34
Antimony—			
Oxide lb.	.14	@	.15
Sulphuret, red lb.	.22	@	.25
Sulphuret, golden lb.	.28	@	.30
Sulphuret, crimson lb.	.45	@	.50
Alcohol, denatured, 190 proof	1.00	@	1.04
Wood, 95 per cent.	3.25	@	3.30
Ethyl, 190 proof	Nominal		
Aldehyde Ammonia	Nominal		
Ammonia, powdered	.17	@	.17½
Ammonium Carbonate, domestic lb.	.16	@	.16½
Amyl Acetate gal.	4.10	@	4.15
Anthracene, 80 per cent.	1.00	@	1.10
Anthroquinine, 95 per ct.	3.75	@	4.25
Asbestine	Nominal		
Asphaltum, Egyptian lb.	.20	@	.25
Domestic ton	.30	@	.40
Barium, dust	—	@	—
Sulphide lb.	—	@	—
Barytes, prime white imported ton	Nominal		
white, domestic ton	35.00	@	40.00
off-color, domestic lb.	20.00	@	30.00
Southern, f. o. b. mills	23.50	@	25.00
Western, f. o. b. mills	23.50	@	26.00
Beeswax	.24	@	.65
Benzidine Base lb.	1.30	@	1.35
Benzol, 90 per ct. gal.	.33	@	.38½
Benzol, pure bulk, 100	.35	@	.40½
Blanc Fixe, dry, bbls. lb.	.06	@	—
Burgundy Pitch, dom. lb.	.08	@	.10
Foreign	.60	@	.65
Blacks, Drop lb.	.05½	@	.15
Ivory lb.	.16	@	.30
Carbon, gas, cases lb.	.15	@	.30
Lampblack R M. lb.	.15	@	.45
Mineral blacks ton	35.00	@	45.00
Blues, Prussian	.95	@	1.00
Soluble lb.	1.00	@	1.05
Ultramarine lb.	.15	@	.50
Browns,			
Umber, Turkey, burnt powdered lb.	.05½	@	.07
American, burnt lb.	.04½	@	.06
Cadmium, sulphide, yellow lb.	1.75	@	2.00
Carbon Disulphide, bulk lb.	—	@	—
Bisulphide lb.	.07½	@	.08
Casein, C. P lb.	.35	@	.36
Castor Oil	.16½	@	.19
Caustic Soda, 76 per ct. cwt.	6.00	@	6.50
Chalk, precipitated, extra light lb.	.05½	@	.06
heavy lb.	.04½	@	.05
China clay, domestic ton	10.00	@	20.00
imported ton	19.00	@	25.00
China Wood Oil, bbls. lb.	.18	@	.18½
F. o. b. Pacific Coast	.15½	@	.16½
Chloroform, U. S. P	.40	@	.45
Coal Tar Pitch	—	@	—
Cottonseed Oil, crude f.o.b. mills lb.	10.50	@	—
Prime summer yellow bbls.	12.00	@	13.00
Dimethylaniline lb.	1.30	@	1.45
Elateron	—	@	—
Formaldehyde, spot lb.	.50	@	.51
Fullers Earth, powd., 100 lbs.	1.50	@	2.00
Fossil flour lb.	.03¾	@	.05
Genasco Mineral Rubber	—	@	—
Gilsonite ton	55.00	@	65.00
Glue, extra white lb.	.35	@	.45
medium lb.	.30	@	.35
low grade	.22	@	.26
foot stock	.19	@	.22
brown foots	.19	@	.22
common bone	.18	@	.21
Glycerine, C. P. (drums) lb.	.28½	@	.29
cans	.29½	@	.30
Graphite, flake (bbl.) lb.	.14	@	.20
powdered (bbl.) lb.	.05	@	.10
Green, chrome, R. M. lb.	.42	@	.70
Ground glass (fine) lb.	.03½	@	.04
Hexamethylene lb.	1.95	@	—
Infusorial earth, powd'd. lb.	.02	@	.035
bolted lb.	.035	@	—
Iron oxide, red, reduced grades lb.	.13	@	.15
red, pure, bright lb.	—	@	—
Hexamethyenetetramine lb.	2.83	@	—
Kaolin	—	@	—
Lime, hydrated	—	@	—
Lead, red, dry (casks) lb.	.12¼	@	.12½
sublimed lb.	—	@	—
white, basic carb. lb.	.10½	@	.11
white, basic sulp. lb.	.10	@	.10¼
Lime flour lb.	—	@	—
Litharge (casks) lb.	.11¾	@	.12¼
English lb.	—	@	—
Lithopone, domestic, bbls. lbs	.08	@	.08¼
in bags lb	.07¾	@	—
M. R. X.	—	@	—
Magnesia, carbonate lb.	.17	@	.21
calcined light lb.	.60	@	.65
Magnesite, calcined, pwd. ton	50.00	@	65.00
Magnesia Oxide, heavy	—	@	—
Light	—	@	—
Extra light	—	@	—
Napthalene lb.	.21	@	.22½
Nirobenzol	.15	@	.16½
Naphtha, motor gasoline, (steel bbls.) gal.	.30	@	—
68 @ 70 degrees (steel bbls.) gal.	.37	@	—
70 @ 72 degrees (steel bbls.) gal.	.38	@	—
73 @ 76 degrees (steel bbls.) gal.	.40	@	—
machine (steel bbls.) gal.	.49	@	—
Oil corn, crude factory cwt.	11.81	@	—
corn, ref. (bbls.) lb.	.17½	@	—
linseed, (bbls.)	1.58	@	—
In carloads, spot	1.50	@	—
tank cars	1.48	@	—
Oil palm, Lagos lb.	.11	@	—
Niger	.10	@	—
pine, yellow gal.	1.00	@	—
distilled gal.	1.25	@	1.35
rapseed, refined gal.	1.55	@	—
rapseed, blown gal.	1.55	@	—
rosin first rectified, gal.	.69	@	—
second run	.72	@	—
tar (commercial) gal.	.38	@	.40
Oleum Acid, 20 per ct. ton	28.00	@	30.00
Orange mineral, Amer. lb.	.15½	@	.16½
imported lb.	Nominal		
Ozokerite	Nominal		
Paraphenylenediamine lb.	2.70	@	2.85
Petrolatum, bbls., amber lb.	.06	@	.07
pale yellow lb.	.06½	@	.07
Paranitrosodimethylanaline	—	@	—
Parafin, refined, 118 @ 120 m. p.	.12	@	—
127 @ 129 m. p.	.11	@	—
137 @ 140 m. p.	.12½	@	—
Phenol	.12	@	.16½
Pumis	.05	@	.10
Pine tar kiln bbl.	14.75	@	—
Pitch bbl.	10.50	@	—
Plaster of paris bbl.	4.25	@	5.00
Red Tuscan lb.	.22	@	.30
red (American) lb.	.15	@	.16
Indian (English) lb.	.15	@	.16
Standard lb.	—	@	—
Rosin (common to good)— 280 lbs.	12.75	@	—
Rotten stone, powdered lb.	.02½	@	.04½
Rubber, substitute, black lb.	.13	@	.17
white lb.	.15	@	.24
brown lb.	.20	@	.25
Rosin Oil, first rectified	.69	@	—
Second rectified	.72	@	—
Third rectified	.88	@	—
Fourth rectified	.94	@	—
Soda ash, light, 58 pct. cwt.	3.25	@	3.45
Sodium Nitrite 96@98 pct.	.16	@	.17½
Solvent Naptha crude, hvy.	.30	@	.35½
Soya Bean Oil, bbls. lb.	.14½	@	.15
Sellers, tanks, f. o. b. Coast	.10½	@	.10¾
Stearic Acid, single	.21½	@	—
Shellac, fine orange lb.	Nominal		
Sulphur Chloride, drums	.06½	@	.16
Shellac	—	@	—
T. N. lb.	1.10	@	1.15
Bleached, ordinary lb.	1.00	@	1.10
Bleached, bonedry lb.	1.25	@	1.35
Silex (silicia) ton	25.00	@	40.00
Soapstone, powdered ton	15.00	@	20.00
Starch, corn, powd. cwt.	5.12	@	—
pearl	4.97	@	—
Jap potato, duty pd, lb.	.06½	@	.07
Sulphur, crude ton	—	@	—
roll 100 pounds	—	@	—
commercial superfine	3.45	@	—
Talc, American ton	2.10	@	2.35
French ton	18.00	@	20.00
Thiocarbanilid	30.00	@	—
Toluol, pure, in drums gal.	—	@	—
commercial	.35	@	.40½
Tripolite earth lb.	.30	@	.32
Turpentine, pure gum—	.01½	@	—
spirit gal.	1.65	@	—
wood gal.	1.62	@	—
Venice, artificial gal.	.15	@	.16
true	4.50	@	—
Vermilion, English lb.	1.60	@	—
American	.25	@	.30
Vorite	Nominal		
Wax, beeswax, crude yel. lb.	.24	@	.26
refined	.32	@	.35
Bayberry	.37	@	.39
ceresin, white lb.	.15	@	.16
yellow	.14	@	.15
Whiting, commercial cwt.	1.40	@	—
Gildérs Bolted	1.45	@	—
Paris white, Amer. cwt.	1.75	@	—
English cliffstone cwt.	2.00	@	—
Xylol (gal.) pure	.40	@	.45
Commercial	.35	@	.40
Zinc Oxide, French process, red seal	.11½	@	.11¾
green seal	.12½	@	.12¾
white seal	.13½	@	.13¾
Leaded Grades—			
Commercial, lead free	.09½	@	.10
5 per ct. lead sulphate	.09	@	.09¼
10 per ct. lead sulphate	.08¾	@	.09¼
20 per ct. lead sulphate	.08½	@	.09
35 per ct. lead sulphate	.08¼	@	.09½
Zinc sulphate	.03½	@	.04¼

Crude Rubber

NEW YORK, AUGUST 5, 1920

Crude rubber is now by far the cheapest raw material entering into manufactured rubber goods, and importers and dealers are unable to maintain even the present low level of prices. The curtailment of production of rubber tires and other rubber goods is being keenly felt in the market for the crude material, and importers find themselves unable to market their stocks through regular trade channels. Many of the smaller tire companies have practically suspended production during the present emergency, and even the larger producers are curtailing operations, one leading maker of rubber tires being down to fifty per cent of capacity.

Para—Up-river fine	.33½	@	.34
Up-river medium	.31½	@	.32
Up-river coarse	.21½	@	.32
Caucho ball	.22½	@	.23½
Islands fine	.32½	@	.33½
Islands coarse	Nominal		
Cameta	.19	@	.20
Ceylon—Smoked sheets, ribbed	.29¼	@	.30
Smoked sheets, plain	.28½	@	.29½
Maderia, fine	.37	@	.39
Knapsack	.44	@	.44½
First latex—pale crepe	.30	@	.30½
Amber crepe, No. 1	.30	@	.31
Amber crepe, No. 2	.29	@	.30
Amber crepe, No. 3	.28	@	.29
Clean Brown Crepe	—	@	—
Rio Nunez String	—	@	—
Palembang	.09	@	.10
African	Nominal		
Prime Surinam sheets	Nominal		
Centrals—Corinto prime	.22	@	.23
Esmeralda, prime	.21½	@	.22½
Balata sheets	—	@	—
Guayule, wet	Nominal		
Balata, block, Panama	.45	@	—

Scrap Rubber

NEW YORK, AUGUST 5, 1920

Reclaimers and manufacturers are still out of the market for scrap rubber, and trading is absolutely lifeless insofar as sales to consumers are expected. The market is being steadily depressed as retailers and gatherers force their holdings on the market, and prices have broken badly during the past fortnight, fractional declines being reported almost daily. Wholesalers are now long on practically all varieties of scrap, but are exceedingly short on orders. Rubber heel manufacturers who normally use reclaimed rubber in the manufacture of their products are now reported to be using crude instead, owing to the cheapness of the latter material.

The slowing down of production in practically all lines has radically cut consumption of reclaimed rubber, according to advices received by the scrap dealers, who look for a dull market and continue depression of prices until late October or possibly early November, when the reclaimers are expected in the market as quantity buyers again.

Boots and shoes	6.12½	@	6.25
Arctics, trimmed	5.25	@	5.50
Arctics, untrimmed	4.25	@	4.50
Tires—Automobile	2.37½	@	2.50
Bicycles, pneumatic	1.50	@	1.75
Mixed hose	1.12½	@	1.25
Air brake	—	@	—
Inner tubes, No. 1	11.00	@	11.50
Inner tubes, No. 2	7.50	@	7.75
Red tubes	7.00	@	—
Black rubber	1.50	@	2.50
Solid tires	2.75	@	3.00

New Truck Repair Molds

An entirely new design of pneumatic truck tire repair mold has been placed on the market by the Western Rubber Mold Company, of Chicago, Ill.

This mold is said to have a number of advantages over other styles of equipment, and it is said one of these is that one mold will accommodate two different sizes of truck tires and fit each size perfectly. This is accomplished by dividing the mold into two halves, each with a separate steam chamber, the division coming in the bottom of the mold and in its exact center. One of these halves is bolted firmly to the feet, the other half being adjustable laterally and held in place by four bolts at the bottom of the mold. The nuts on these bolts may be loosened up to admit the insertion of the spacer of special metal, of aluminum composition, which is a very quick heat conductor. This expands the mold from the smaller size to the larger and the operation of either expanding or contracting does not consume a minute's time.

The stationary side of the mold is connected to the steam line with permanent piping but the adjustable side is connected with steam hose, which allows for the adjustment of the mold without damaging the steam connection. The advantages of a mold of this description are easily seen. By combining two sizes in one the cost of equipment for truck tire repairing and the floor space required is greatly reduced. By having two separate steam cavities the heat may be localized to either side when a repair is necessary on only one side of the casing.

Another feature of this equipment is its cross-sectional contour. Experiments conducted in co-operation with the truck tire experts of the leading tire manufacturers developed a cross-sectional shape which more nearly fits all classes and styles of truck tires than the ordinary round bottom mold. This shape can be described as being semi-flat on the tread and having an "O.G." curve from the tread to the plane of the sidewall, a shape that not only fits the semi-flat tread type of tires perfectly but it more nearly fits all round treads, especially after they have worn down somewhat, as they usually are by the time they require repairing. Another advantage of these molds is that they will not only cure all kinds of spot and section jobs with air and steam bag pressure but they may also be equipped with anti-skid matrices and sand bags to produce various designs of anti-skid retreads.

These molds have been tested and stamped with the approval of the tire engineers of many of the leading truck tire manufacturers and adopted by them as the standard equipment for repairing all truck pneumatic tires. They come in sizes from 37 x 5½ up to and including the 44 x 10.

Seek Protective Tariff in England

Importation of American automobile tires has been made the subject of an attack by the Rubber Workers' Union, of England, which has petitioned the Government for a prohibitive tariff. This action comes as the direct result of the laying off of 2,700 workmen at the Dunlop tire plant, accompanied by the announcement that the step was made necessary to a large degree through foreign competition.

The Rubber Workers' Union, in their petition, say that a protective tariff would prevent unemployment. They recommend to Chamberlain March that a tariff of thirty per cent be imposed, but no action has been taken.

Bergougnan Dividend Declared

At a regular meeting of the board of directors of the Bergougnan Rubber Corporation, held at the company's main offices in Trenton, New Jersey, on July 14, a dividend of one and three quarters per cent per share of preferred stock was declared payable on August 10 to holders of record June 10.

The important additions to the Bergougnan plant in Trenton, which have been under construction for several months, are now approaching completion. They consist of a new two story unit of the same size and type as the two other main units of the Bergougnan plant, a warehouse, a rubber cement mixing and storing building, a machine shop, a carpenter shop, and a large garage and repair shop for motor trucks and passenger cars.

Goodyear Gives Production Figures

Interesting figures relative to the production of the Goodyear Tire & Rubber Co. were sent out recently from Akron. Among other things the firm stated that last year 45,000,000 pounds of cotton fabric were used for various products, while in the same period 108,000,000 pounds of rubber were manufactured into products for use all over the world.

If the total amount of rubber used in 1919 was transported at one time, the train of 689 freight cars needed would stretch for a distance of seven miles. It would be the annual production from 20,000,000 rubber trees, which would cover 208,000 acres of ground.

To store this vast amount of rubber—equal to thirty-nine days supply for the entire world—6,000,000 cubic feet of floor space would be required. This mountain of crude rubber would suffice for the manufacture of approximately 9,000,000 tires.

Every working day six miles of belting, six tons of packing and eleven miles of hose are turned out by 35,000 employes in addition to 45,000 automobile tires. Four million pairs of rubber soles for shoes are made every twelve months and more than 30,000,000 pairs of rubber heels are turned out in the same period.

Lowenthal Co. Reorganized

The Lowenthal Company, New York, well known large operators in scrap rubber and scrap metals, has been reorganized, according to papers filed with the Secretary of State, at Albany, to carry on business with $1,000,000 and 5,000 shares preferred stock, $100 each, and 5,000 common, no par value.

Miller Sales Increase

(Special Akron Correspondence)

Miller Rubber Co. sales for the first six months of the present year totalled $18,376,793.17 as compared with $10,990,515.25 for the corresponding period last year. Sales for the whole of 1919 were $26,495,482.86. Sales by months follow:

	1919.	1920.
January	$1,447,874.57	$3,053,883.02
February	1,691,504.39	2,967,551.45
March	1,824,149.52	3,693,364.19
April	1,932,690.58	2,739,281.44
May	1,898,196.75	2,911,432.08
June	2,196,099.44	3,003,760.99
Total	$10,990,515.25	$18,376,793.17

New Chemical Company

The Holly-Wood Chemical Co., manufacturers of chemicals and manufacturers' representatives, at 101 Beekman Street, New York, have announced that they are now in a position to supply the rubber industry with chemicals and compounding materials. Although in business for some time the firm has not until the present time entered the rubber field. A. P. Gottfried and S. F. Demant, of Copenhagen, are at the head of the company. Branches are maintained in Baltimore, Philadelphia, Buffalo and San Francisco.

American Rubber Patents

ISSUED JULY 13, 1920

1,346,113—To Shelby L. Church, Houston, Texas. Pneumatic tire.

1,346,184—To Thomas A. Dickinson, Youngstown, Ohio. Self-filling fountain pen.

1,346,231—To Thomas Midgley, Sr. and Thomas Midgley, Jr., Dayton, Ohio, assignors to Fisk Rubber Co., Chicopee Falls, Mass. Tire-core.

1,346,232—To Thomas Midgley, Springfield, Mass., assignor to Fisk Rubber Co., Chicopee Falls, Mass. Overflow-cavity for molds.

1,346,290—To Frederick P. Woodward, Topsfield, Mass., assignor one-half to Esther A. Woodward, Boston, Mass. Resilient inner tube for vehicle tires.

1,346,336—To Richard S. Reed, Kokomo, Ind. Vehicle-tire.

1,346,346—To Harry A. Siprelle, Cleveland, Ohio. Tire.

1,346,389—To Fred A. Strang, Dallas, Texas, assignor to Gibraltar Tire & Rubber Co., Dallas, Texas. Process of making cushion tires.

1,346,468—To Giuseppe Rubino, Turin, Italy. Rim for pneumatic-tired wheels.

1,346,503—To Shaverksha D. Master, Broach, India. Tire.

1,346,514—To William Small and John G. Small, Patterson, N. J. Vehicle-tire.

1,346,623—To William E. Williams, Chicago, Ill., assignor to Firestone Tire & Rubber Co., Akron, Ohio. Method of making tire-casings.

1,346,627—To William Barber, New York, N. Y., assignor to Ada S. Barber, Brooklyn, N. Y. Tire-tread.

1,346,632—To Frank S. Bennett, Philadelphia, Pa. Inner-tube covering for tires.

1,346,683—To Joseph N. Reynolds, Atlantic, Iowa. Hand-covering.

1,346,692—To Andres Balaguer, Marianao, Habana, Cuba. Resilient tire for vehicle-wheels.

1,346,695—To Emory J. Benedict and Mollie C. Frost, Memphis, Tenn. Resilient tire.

1,346,766—To Jean Auguste Prince and Albert Louis Gilles, Nice, France. Vehicle-tire.

ISSUED JULY 20, 1920.

1,346,834—To Charles E. McManus, New York, N. Y. Resilient rod.

1,346,848—To Fred Thomas Roberts, Cleveland Heights, Ohio, assignor to Paramount Rubber Consolidated, Inc., Philadelphia, Pa. Method of making hollow rubber articles.

1,346,945—To Charles Drouet, Houston, Texas. Pneumatic tire.

1,346,961—To John L. Jackson, River Forest, Ill. Indicator for pneumatic tires.

1,346,991—To George Mickle Tatum, Media, Pa. Rubber ball.

1,347,060—To Joseph Spadafora, Cambridge, Mass. Resilient tire.

1,347,144—To William J. Bruce, Sterling, Ill. Demountable rim for automobile wheels.

1,347,213—To Oscar T. DeLong, Atlanta, Ga. Clamp for vulcanizing machines.

1,347,368—To Thomas H. Gyton, Collingwood, Victoria, Australia. Non-skid protector.

1,347,439—To George H. Budd, Salt Lake City, Utah. Tire-casing seal.